PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

SUMMER TERM / MAKE UP END TERM EXAMINATION

Semester: Summer Term 2019   **Date**: 22 July 2019

Course Code: CIV 211   **Time**: 2 Hours

Course Name: Design of RC Elements   **Max Marks**: 80

Program & Sem: Civil & V Sem (2015 Batch)   **Weightage**: 40%

Instructions:

(i)   *Read the question properly and answer accordingly.*
(ii)   *Question paper consists of 3 parts.*
(iii) *Scientific and Non-programmable calculators are permitted.*
(iv)   *IS 456 -2000 & SP 16 code books are permitted*

Part A

Answer **all** the Questions. **Each** question carries **one** mark.   (10Qx1M=10)

1.

(i) Bond strength between steel and concrete is due to

    a) Friction   b) Adhesion   c) Both friction and adhesion   d) None of these

(ii) The limits of percentage of the longitudinal reinforcement in a column is given by

    a) 0.15 % to 2%   b) 0.8% to 6%   c) 0.8 to 4%   d) 0.8 to 8%

(iii) Lateral ties in RC column are provided to resist

    a) Bending moment

    b) Shear

    c) Both bending moment and shear

    d) Buckling of longitudinal steel bars

(iv) Design of R.C.C. simply supported beams carrying U.D.L. is based on the resultant B.M. at

    a) Supports b) Mid-span c) Every section d) quarter Span

(v) What is the value of flexural strength of M 25 concrete?

    a) 4.0 Mpa   b) 3.5 Mpa   c) 3.0 Mpa   d) 1.75 Mpa

(vi) In the limit state design of concrete structures, the strain distribution is assumed to be

    a) Linear   b) non-linear   c) parabolic   d) parabolic and rectangular

(vii) The compressive strength of 100 mm concrete cube as compared to 150 mm concrete cube is always

    a) Less   b) More   c) Equal   d) None of these

(viii)   Flexural collapse in over reinforced beams is due to

    a) Primary compression failure c) Primary tension failure

b) Bond failure   d) None of these

(ix) What is the minimum number of longitudinal bars provided in a reinforced concrete column of circular cross-section?

   a) 4   b) 5   c) 6   d) 8

(x) Define limit state of collapse

Part B

Answer all the Questions. Each question carries fifteen marks.   (3Qx15M=45)

2. Design the reinforcements in a column of size 400 mm by 600 mm subjected to an axial factored load of 3000 kN. The column has an unsupported length of 3m and is braced against side sway in both directions. Adopt M-20 grade concrete and Fe-415 HYSD bars. Sketch the details of reinforcement

3. Design a short circular column of diameter 400 mm to support a factored axial load of 900 KN, together with a factored moment of 100 kN-m. Adopt M20 grade concrete and Fe 41ᶜ grade steel. Sketch the details of reinforcement

4. Design a simply supported RCC slab for an office floor having clear dimensions of 4m by 10m with wall 230 mm wall around. Adopt M20 Grade concrete and Fe 415 grade Hysd bars. Take live load = 4 kN/m^2 and floor finish = 1.5 kN/m^2 and sketch the details of reinforcement.

Part C

Answer the Question. The Question carries twenty five marks.   (1Qx25M=25)

5. Design an isolated footing for a square column, 450 mm X 450 mm, reinforced with 8 bars of diameter 25 mm, carrying a service load of 2300 kN. Assume soil with a bearing capacity (gross) of 300 kN/m^2 at a depth of 1.5 m below ground. Assume M20 grade concrete and Fe 415 grade steel for the footing, and M25 grade concrete and Fe 415 steel for thᵉ column. Sketch the details of reinforcement.